Barriers to Aquaculture Development as a Pathway to Poverty Alleviation and Food Security:

Policy Coherence and the Roles and Responsibilities of Development Agencies

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Malcolm Beveridge, Michael Phillips, Patrick Dugan and Randy Brummett
e.g. fish and food security

- an important source of nutrition for 2.6 billion, mostly poor, people
  - protein and energy
  - vitamins, minerals, EFAs
  - ‘.. rich food for poor people..’

- e.g. sub-Saharan Africa
  - > 400 million people depend on fish for most of their animal protein intake
  - fish consumption is the lowest in the world
  - 1.6 million t more fish needed by 2016 to maintain consumption
is aquaculture a good use of resources?

- can produce more protein and $$ per drop of water than other crops

- can be ecologically efficient
  - aquatic herbivores/omnivores
  - integration with agriculture increases ‘crop per drop’
    - can maintain /provide or consume ecosystem services

- determined by species, system, intensity of production methods
• two key questions

  – how - and under what conditions - can aquaculture make substantive improvements to livelihoods, foster economic growth and improve food security without compromising ecosystem services?

  – what are the policy barriers to achieving this and how can they be addressed?
aquaculture in the developing world
aquaculture – a global picture

Aquaculture production by region, 2006

Asia (excluding China) and the Pacific: 66.5%
China: 22.8%
Europe, North America and Africa: 10.5%


Vietnamese catfish: 930,000 t
Nile tilapia: 2,797,819 t
Warm-water shrimp: 2,845,750 t

http://www.gourmet.com/foodpolitics/2008/04/
aquaculture – a global picture

Aquaculture production by region, 2006

- Asia (excluding China) and the Pacific: 66.5%
- China: 22.8%
- Other regions: 10.5%

• within the developing world, aquaculture production is very uneven
• consequently, impacts on poverty and hunger are limited

aquaculture, poverty and food insecurity
aquaculture development focus

- historical development focus by development agencies on poor smallholders
- appropriate land, water, soils, etc.

fish ponds, Uganda, 1950s

integrated fish ponds, Singapore, 1950s
smallholders, Bangladesh

- **5 year**, USAID project (DSAP)
- beneficiaries
  - 68,400+ farmers
- food security
  - > 8200 tonnes
- household-level benefits
  - production: 1542 → 3046 kg per ha
  - fish income: $1130 → $2200 per ha
  - total farm income: 13% → 17%
  - fish consumption: 46 → 58 g per person per day
  - empowered women
conclusions - *Bangladesh*

- **1988**: 338,000 tonnes
- **2007**: 1,613,000 tonnes

  - two thirds of total fish supplies

- most from poor smallholders

- **how?**
  - pond area (land and water)
  - productivity increases
smallholders, Malawi

- **20 year** multi-partner engagement
- Increase from 300 → 7000 farms
- Farm productivity improved by **10%**
- Income per ha increased by **134%**
- Total farm income increased by **61%**
- Per capita consumption of fresh (**208%**) and dried fish (**21%**) increased
- Improved nitrogen use efficiency
- Greater resilience to drought
conclusions - Malawi

• benefits smallholders, communities
  – improves total farm productivity
  – improves resilience to shocks

*but* ....

• modest impacts on food security

<table>
<thead>
<tr>
<th>Year</th>
<th>Annual per capita fish consumption</th>
<th>Aquaculture production</th>
</tr>
</thead>
<tbody>
<tr>
<td>1986</td>
<td>10 kg</td>
<td>188 t</td>
</tr>
<tr>
<td>2006</td>
<td>6 kg</td>
<td>1500 t</td>
</tr>
<tr>
<td>2011</td>
<td>10 kg?</td>
<td><strong>60,000 t</strong></td>
</tr>
</tbody>
</table>
why the regional differences?

- **Asia**: agricultural production has increased a lot
  - largely through improved productivity

- **Africa**: agricultural production cannot now feed the people
  - expansion of agricultural land, but with little increase in productivity

- also differences in population density, markets, aquaculture traditions

*source: Devarajan, World Bank, 2009*
African aquaculture has started growing

**Source:** FAO Fishstat
top ten producers - *quantities and growth*

<table>
<thead>
<tr>
<th>Top ten producers in terms of quantity, 2006</th>
<th>Top ten producers in terms of growth, 2004–06¹</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2004 (Tonnes)</td>
</tr>
<tr>
<td>China</td>
<td>30 614 968</td>
</tr>
<tr>
<td>India</td>
<td>2 794 636</td>
</tr>
<tr>
<td>Viet Nam</td>
<td>1 198 617</td>
</tr>
<tr>
<td>Thailand</td>
<td>1 259 983</td>
</tr>
<tr>
<td>Indonesia</td>
<td>1 045 051</td>
</tr>
<tr>
<td>Bangladesh</td>
<td>914 752</td>
</tr>
<tr>
<td>Chile</td>
<td>665 421</td>
</tr>
<tr>
<td>Japan</td>
<td>776 421</td>
</tr>
<tr>
<td>Norway</td>
<td>636 802</td>
</tr>
<tr>
<td>Philippines</td>
<td>512 220</td>
</tr>
</tbody>
</table>

*source: SOFIA, FAO (2009)*

... much due to SMEs
Small-Medium Enterprise aquaculture

- a wide range of producers
- produce < 100 tonnes
- conditions for success
  - strong markets
  - access to seed, feed, credit and transport
- a focus on profits

*source: Randy Brummett,*
SME aquaculture value chain

- impact on rural and periurban economies
- development impact created through entire value chain
  - upstream and downstream
  - value added
  - employment: 2-3 fold
- women
- socially marginalized

modified from DFID RIU
EC Adivasi project, Bangladesh 2007-09

<table>
<thead>
<tr>
<th>Activity</th>
<th>Adivasi households</th>
</tr>
</thead>
<tbody>
<tr>
<td>fish culture in ponds/ditches</td>
<td>1238</td>
</tr>
<tr>
<td>fish culture in rice fields</td>
<td>527</td>
</tr>
<tr>
<td>fingerling production in cages in pond/canal</td>
<td>488</td>
</tr>
<tr>
<td>fingerling trading</td>
<td>154</td>
</tr>
<tr>
<td>food fish trading</td>
<td>403</td>
</tr>
<tr>
<td>fish harvesting team member</td>
<td>743</td>
</tr>
<tr>
<td>habitat restoration</td>
<td>41</td>
</tr>
<tr>
<td><strong>total</strong></td>
<td><strong>3594</strong></td>
</tr>
</tbody>
</table>

*source: Benoy Barman*
conclusions and recommendations
aquaculture and development

- aquaculture is becoming the most important source of aquatic food

- bulk of production from developing countries
  - geographically uneven
  - limited impacts on poverty and food security

- focus on poor smallholders in Africa has had limited impacts on food security and poverty

- more coherent approach to aquaculture and development

source: http://ec.europa.eu/commission_barroso/borg/img/photos/hottopic_7.jpg
policy cohesion for development

PCD - ‘.. the pursuit of development objectives through the systematic promotion of mutually reinforcing policy actions on the part of both developed and developing countries’.

source: OECD

source: http://www.fairpolitics.nl/europa
PCD - *roles of developing countries*

- is aquaculture important?
  - engage stakeholders in dialogue
  - national strategies
    - poor smallholders and poverty
    - SMEs and food security and economic growth
- create favourable investment climate
  - coherent policies across sectors
  - recognize and agree trade-offs
  - governance, transparency, anti-corruption, accountability, user rights
PCD - *roles of OECD countries*

- coherent, mutually supportive policies among sectors
  - trade
    - OECD imports 60% of its fish from developing countries (excluding fishmeal and fish oil for aquaculture)
  - food safety & public health
  - development
  - environment
  - energy

- coherence among and within donor agencies

source: http://upload.wikimedia.org/wikipedia/commons/f/fc/-OECD-highincomestates.PNG
PCD – *roles of development agencies*

- understand
  - costs and benefits from different types of aquaculture development
    - consider entire value chain
    - location-specific economic, social, political realities in implementation

- invest in training, capacity building
  - e.g. trade
    - food safety standards - clarity, stability and assistance

- champion PCD
fin